



# **Kennedy/Jenks Consultants**

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**Kennedy/Jenks Consultants**

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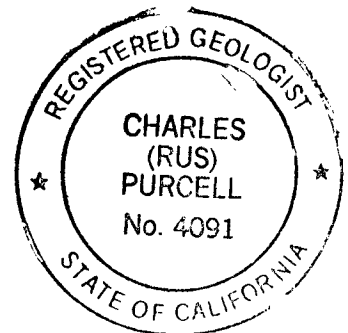
**Groundwater Monitoring  
Work Plan 2000**

**Boeing Realty Corporation  
Former C-6 Facility • Los Angeles, California**

15 December 2000



Charles (Rus) Purcell R.G.



19 December 2000  
C6-BRC-T-00-006

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
Los Angeles Region  
320 W. 4<sup>th</sup> Street, Suite 200  
Los Angeles, CA 90013



Attention: John Geroch

Subject: **GROUNDWATER MONITORING WORKPLAN FOR BOEING  
REALTY CORPORATION, FORMER C-6 FACILITY,  
19503 SOUTH NORMANDIE AVENUE, LOS ANGELES, CA**

Dear Mr. Geroch:

Please find enclosed for your review, a copy of the subject document prepared by Kennedy/Jenks Consultants for Boeing Realty Corporation.

If you have any questions concerning this document, please contact the undersigned at 562-593-8623.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephanie Sibbett".

Stephanie Sibbett  
Boeing Realty Corporation

Cc: Mario Stavale, Boeing Realty Corporation  
Scott Lattimore, Long Beach Division

enclosure

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**Groundwater Monitoring  
Work Plan 2000**

**Boeing Realty Corporation  
Former C-6 Facility • Los Angeles, California**

15 December 2000

Prepared for

**Boeing Realty Corporation**

3760 Kilroy Airport Way  
Long Beach, CA 90806

K/J 004016.00

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# 1 INTRODUCTION

This work plan for continuing groundwater monitoring at Boeing Realty Corporation's (BRC) Former C-6 Facility in Los Angeles, California (Site, Figure 1) was prepared by Kennedy/Jenks Consultants (Kennedy/Jenks) for submittal to the Los Angeles Regional Water Quality Control Board (LARWQCB). The plan recommends changes to the groundwater-monitoring program that has been in place since 1987. A total of 35 monitoring events have been performed since 1987 and the available data suggest that a reduced monitoring frequency is appropriate. Specific wells and analytical testing are identified for an annual event in January 2001 and a semiannual event in July 2001.

## 1.1 Background

Groundwater information in the Site vicinity (Figure 2) comes from three primary sources:

- Project wells installed at the Site by BRC and its predecessors (prefixes include WCC and TMW).
- Wells installed cooperatively for investigations at International Light Metals (ILM) and the Site (prefixes include DAC and BL).
- Wells installed on the Site by Montrose Chemical Corporation (Montrose) for investigations at Montrose (prefix XMW)

Groundwater investigations at the Site began in early 1987 with the installation of a single groundwater monitoring well. A total of 40 wells have been installed at the Site for groundwater investigations since 1987. Ten of these wells have been abandoned as a result of redevelopment activities. Montrose drilled an additional five wells on the Site, three of which remain open. Wells known or assumed to currently exist in the Site vicinity are shown in Figure 2. There are a total of 33 wells that are currently open on Site. Well completion details for these wells are shown in Table 1.

All of these wells sample the shallow groundwater system that is commonly referred to as the Bellflower B-Sand and C-Sand or B/C-Sand. WWC-3D is completed at the base of the C-Sand, just above the Lower Bellflower Aquitard that overlies the Gage Aquifer.

The frequency of previous groundwater monitoring at the Site was variable. Typically, all open wells were sampled during each groundwater monitoring event. The two initial groundwater sampling events (late 1987 to mid 1992) were widely spaced. Between June 1992 and May 1997, groundwater monitoring was performed quarterly. A special biweekly groundwater monitoring program consisting of six monitoring events was initiated in July through September 1997. During 1998 and 1999 groundwater sampling was performed three times per year. Groundwater monitoring was performed twice in 2000. The results of historical groundwater sampling at the Site were routinely reported to the LARWQCB in a series of groundwater monitoring reports prepared by Kennedy/Jenks and others.

The most recent groundwater monitoring data were collected in June 2000 and the associated report (Kennedy/Jenks, 2000) describes a typical monitoring event for the Site:

- All open project wells (i.e., 30 wells in June 2000) were gauged, purged, and sampled.



- Water samples were analyzed for Volatile Organic Compounds (VOCs) by EPA Method 8260, Title 22 Metals by EPA Method 6010, and Chromium VI by EPA Method 7196.
- An appropriate number of duplicate samples, trip blanks, and equipment blanks were collected and analyzed for quality control.

## **1.2 Approach**

The general approach to future groundwater monitoring at the Site is to reduce the frequency of monitoring events and the number of wells monitored while continuing to track long-term changes in Volatile Organic Compound (VOC) concentrations in onsite groundwater monitoring wells.

Historical monitoring data demonstrate that VOC concentrations in most wells installed from 1987 to 1990 have been relatively stable, therefore the monitoring frequency for these wells will be reduced to one event per year (i.e. annual monitoring). Wells installed since 1998 do not have the same historical monitoring record and will be monitored twice a year (i.e., annually and semiannually). Analytes tested and laboratory methods used in the groundwater monitoring program will be those used previously to provide consistency. Details of the proposed program are further described in Section 2.

Adjustments to the proposed monitoring program may be made as necessary. For example, 1,4-dioxane was recently detected in several soil samples and, as described below, the laboratory will be asked to test for 1,4-dioxane in selected wells during the next sampling event. Modifications to the monitoring program will be made as the need for modifications is recognized.

## **2 PROPOSED GROUNDWATER MONITORING PROGRAM**

The proposed groundwater-monitoring program consists of two event types:

- Annual monitoring (first event January 2001) and
- Semiannual monitoring (first event July 2001).

The above event types are described in Sections 2.1 through 2.2. General monitoring considerations are described in Section 2.3. Details of the groundwater monitoring are described in Table 1 and Figures 2 and 3.

### **2.1 Annual Groundwater Monitoring**

All open wells at the Site will be monitored during the annual groundwater monitoring event (i.e., a total of 33 wells). Water levels will be measured in open wells at the Site.

Groundwater samples will be collected and analyzed for the following chemicals of concern:

- VOCs by EPA Method 8260 including butanones in all wells and fuel oxygenates in wells that contain toluene.
- Title 22 metals (including total chromium) by EPA Method 6010.
- Hexavalent chromium by EPA Method 7196.

Because 1,4-Dioxane was recently detected in two shallow soil samples located upgradient of TMW-5, the laboratory will be asked to extend the 8260 analysis to include 1,4-dioxane in the following wells for the January 2001 sampling event:

- WCC-3S and WCC-6S
- TMW-2, TMW-4, TMW-5, and TMW-12

Should 1,4-dioxane not be detected, or be detected in selected wells, subsequent testing for 1,4-dioxane may be eliminated or scaled back.

Wells installed by Montrose will be sampled if necessary agreements are reached with Montrose and the necessary construction details are available.

### **2.2 Semiannual Monitoring**

A semiannual monitoring event will be performed about six months after the January 2001 monitoring event (i.e., July 2001). The routine groundwater-monitoring program described in Section 2.3.1 will be performed at a reduced number of wells (i.e., a total of 19 wells) as indicated in Table 1. Wells sampled during the semi-annual monitoring event are those for which a significant historical record is not currently available. Samples collected during the semiannual event will be tested for VOCs by EPA method 8260 (Table 1). Water levels will be measured in all open wells at the Site.

## **2.3 General Monitoring Considerations**

### **2.3.1 Routine Water Quality Testing**

In accordance with the federal Occupational Safety and Health Act (OSHA), the work will be performed under a site-specific Health and Safety Plan that complies with OSHA standards for potentially hazardous field investigations (29 CFR 1910.120). The existing Health and Safety Plan for groundwater monitoring at the BRC Former C-6 Facility will be used.

Groundwater levels will be measured to the nearest one-hundredth of a foot using an electronic water level meter prior to purging and sampling the wells. PID measurements will be made following the removal of the well cap and recorded on a Daily Field Measurement Record. Field data will be collected and recorded on standard groundwater monitoring forms.

Each well will be purged by extracting a minimum of three wetted well casing volumes of standing water with a pump. Purged water will be periodically monitored for temperature, pH, and specific conductance. Purging will be completed when five well volumes have been removed, or when two consecutive measurements of specific conductance, pH and temperature give values within 10% of each other.

After these parameters have stabilized, groundwater samples will be collected from the pump discharge in appropriate containers. Field data will be recorded on a standard groundwater purge and sample form. Samples will be stored on blue ice in a cooler and transported by courier to a California-certified analytical laboratory for analysis under proper chain-of-custody. Chain-of-custody forms will be maintained throughout sample collection and transport.

All equipment used for well purging and sampling will be cleaned between wells with an Alconox solution (or equivalent) and then rinsed with tap water and deionized or distilled water to reduce the potential for cross-contamination. Well purge water and water used to decontaminate equipment will be deposited in DOT 55-gallon drums, properly labeled, and stored on site at a location selected by BRC. The drums will be properly manifested and disposed of by BRC following receipt of laboratory results.

Groundwater analytical results will be reported in units of milligrams per liter (mg/L) or micrograms per liter ( $\mu\text{g/L}$ ) on RWQCB Laboratory Report Forms 10A/10B or their equivalent.

### **2.3.2 Quality Assurance and Sample Identification**

One duplicate groundwater sample will be collected for every 20 groundwater samples. Sample duplicates are a check for sampling and analytical precision. During the annual sampling event, the duplicate will be analyzed for VOCs, Title 22 Metals, and hexavalent chromium. During the semiannual event, duplicates will be tested for VOCs only. Duplicates will be collected, numbered, packaged, and sealed in the same manner as the other samples. Duplicates will be assigned separate sample numbers and submitted blind to the laboratory.

Equipment rinse blank samples are a check for cross-contamination during sample collection. An equipment blank will be collected when sampling equipment is cleaned and

reused in the field. Appropriate water will be used to fill or rinse the sampling equipment after the equipment has been cleaned, and then collected in the sample containers. One equipment rinsate blank sample will be collected for every 20 groundwater samples. During the annual sampling event, the equipment rinsate blank will be analyzed for VOCs, Title 22 Metals, and hexavalent chromium. During the semiannual event, the equipment rinsate blank will be tested for VOCs only.

One travel blank will be prepared in the laboratory for each day that groundwater samples are collected and shipped to the laboratory. The travel blanks will be prepared in a clean environment and kept in the cooler used to ship samples. The travel blank provides a check for cross-contamination during transport, and will be analyzed for VOCs.

### **3 EVENT SCHEDULING AND REPORTING**

BRC will notify LARWQCB a minimum of one week prior to the start of groundwater monitoring events.

BRC will prepare and submit groundwater-monitoring reports similar to those submitted to date that as a minimum contain:

- A groundwater elevation contour map
- Tables and maps that depict the results of water quality testing
- Groundwater sampling forms, field notes documenting field testing
- Laboratory reports and chain of custody documentation
- Appropriate descriptions of the sampling event, test results, and discussion and conclusions regarding water quality and hydrogeologic changes at the Site
- Discussion of changes in Site/well conditions that might affect future sampling events, and
- Recommendations for modifications to the sampling program, if any.

Reports will be submitted to LARWQCB about two months after the completion of each sampling event.

#### **4 REFERENCES**

Kennedy/Jenks Consultants, 2000, Groundwater Monitoring Report 2<sup>nd</sup> Quarter 2000, Boeing Realty Corporation's C-6 Facility, Los Angeles. Prepared for Boeing Realty Corporation, Long Beach, CA. Dated July 2000.

## Tables

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**Table 1.**  
**Proposed Monitoring Program**  
**Boeing Realty Corporation, Former C-6 Facility**  
**Los Angeles, California**  
**K/J 004016.00**

Well	Date Constructed	Depth of Screened Interval (Feet BGS)		Hydro. Strat. Unit	Times Monitored	Well Monitoring Program	
		Top	Bottom / Total Depth			Annual (January)	Semiannual (July)
WCC-3S <sup>1</sup>	10/26/87	69	89	B/C Sand	36	VOCs, Title 22 Metals, Chrome VI	
WCC-3D <sup>2</sup>	06/27/89	120	140	C Sand	35	VOCs, Title 22 Metals, Chrome VI	
WCC-4S <sup>1</sup>	10/27/87	70.5	90.5	B/C Sand	36	VOCs, Title 22 Metals, Chrome VI	
WCC-5S <sup>1</sup>	11/24/87	60.5	91	B/C Sand	36	VOCs, Title 22 Metals, Chrome VI	
WCC-6S <sup>2</sup>	09/22/89	60	90	B/C Sand	30	VOCs, Title 22 Metals, Chrome VI	
WCC-7S <sup>2</sup>	06/08/89	60	90	B/C Sand	34	VOCs, Title 22 Metals, Chrome VI	
WCC-9S <sup>2</sup>	09/21/89	60	90	B/C Sand	33	VOCs, Title 22 Metals, Chrome VI	
WCC-10S <sup>2</sup>	06/07/89	60	90	B/C Sand	32	VOCs, Title 22 Metals, Chrome VI	
WCC-11S <sup>2</sup>	09/13/90	60	90	B/C Sand	32	VOCs, Title 22 Metals, Chrome VI	
WCC-12S <sup>2</sup>	09/17/90	60	90	B/C Sand	32	VOCs, Title 22 Metals, Chrome VI	
DAC-P1 <sup>1</sup>	09/25/89	60	90	B/C Sand	32	VOCs, Title 22 Metals, Chrome VI	
TMW-1	06/28/98	61	81	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-2	06/28/98	62	82	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-3	07/21/98	62.5	82.5	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-4	06/30/98	60	80	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-5	07/02/98	61.3	81.3	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-6	07/01/98	61.2	81.2	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-7	06/29/98	64	84	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-8	06/29/98	61	81	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-9	06/30/98	61	81	B/C Sand	6	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-10	01/28/99	60.5	80.5	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-11	02/01/99	58	78	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-12	01/27/99	62	82	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-13	02/02/99	60	80	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-14	02/03/99	65	85	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-15	02/04/99	62	87	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
TMW-16	01/29/99	56.5	76.5	B/C Sand	3	VOCs, Title 22 Metals, Chrome VI	VOCs
BL-1	02/02/99	61.5	81.5	B/C Sand	4	VOCs, Title 22 Metals, Chrome VI	VOCs
BL-2	02/03/99	61.5	81.5	B/C Sand	4	VOCs, Title 22 Metals, Chrome VI	VOCs
BL-3	02/08/99	62	82	B/C Sand	4	VOCs, Title 22 Metals, Chrome VI	VOCs
XMW-09 <sup>3</sup>	05/09/89	66	81	B Sand	—	VOCs, Title 22 Metals, Chrome VI	
XMW-18 <sup>3</sup>	03/29/90	68	83	B Sand	—	VOCs, Title 22 Metals, Chrome VI	
XMW-19 <sup>3</sup>	03/30/90	63	79	B Sand	—	VOCs, Title 22 Metals, Chrome VI	

**NOTES:**

1. Data from Woodward-Clyde Consultants Phase II Report, May 1988.
2. Data from Woodward-Clyde Consultants Phase III Report, March 1990.
3. Wells drilled for the Montrose groundwater monitoring program (See text for description).

B-Sand - Groundwater in Middle Bellflower Aquitard shallow sand.

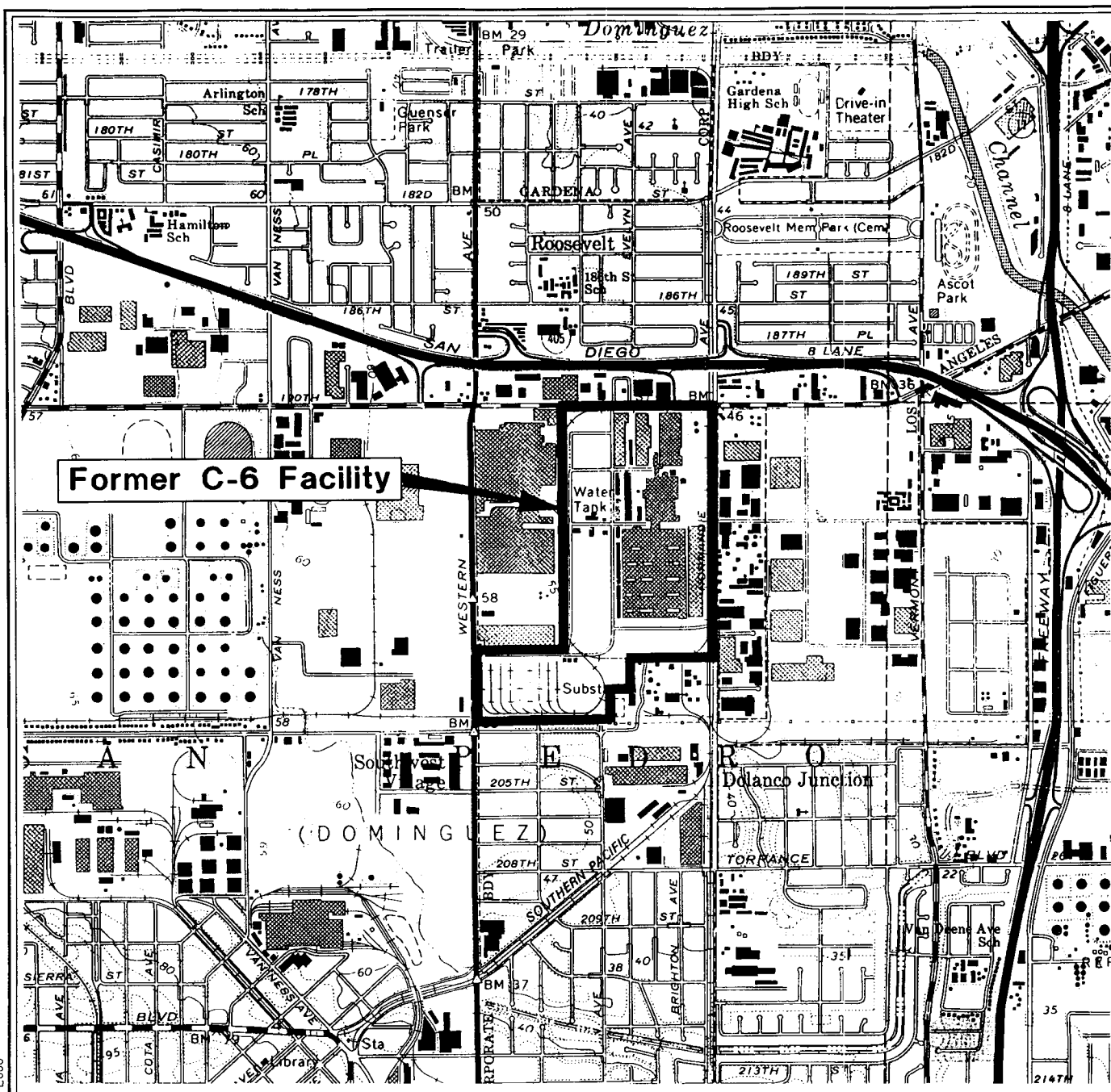
C-Sand - Groundwater in Middle Bellflower Aquitard deeper sand.

B/C Sand - Groundwater in Middle Bellflower Aquitard sand undifferentiated.



## Figures

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Source: Basemap modified from  
U.S.G.S. Torrance, California  
7.5 Minute Quadrangle  
Photorevised 1981

0 2000 4000  
Approximate Scale in Feet



### Kennedy/Jenks Consultants

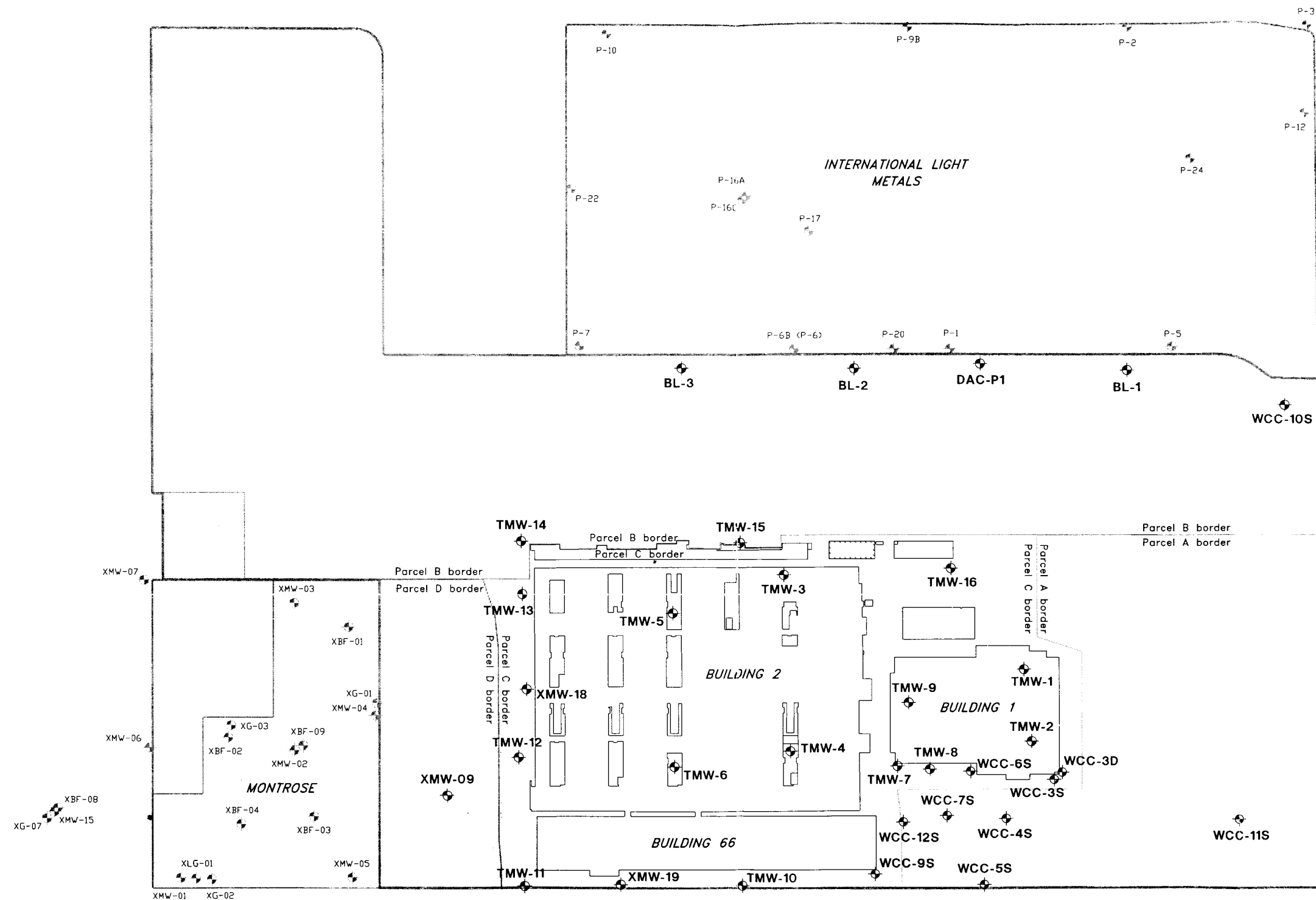
Boeing Realty Corporation  
Former C-6 Facility

### Site Location Map

December 2000  
K/J 004016.00

Figure 1

K:\Boeing\MDRC C-6\Jun2001-Sampling Event\Dec2000-F\IG2.dwg, 12/15/2000



#### LEGEND



EXISTING WELLS AT FORMER C-6 SITE, ILM AND MONTROSE.

**BOLD** - ROUTINE TESTING

PREFIXES BEGINNING WITH W, T, B AND D ARE FORMER C-6 FACILITY WELLS

PREFIX BEGINNING WITH P IDENTIFIES INTERNATIONAL LIGHT METALS WELL

PREFIX BEGINNING WITH X IDENTIFIES MONTROSE CHEMICAL CORPORATION WELL

NOTE: THE STATUS OF OFFSITE MONTROSE WELLS HAS NOT BE CONFIRMED.  
SOME WELLS MAY HAVE BEEN ABANDONED.

**Kennedy/Jenks Consultants**

Boeing Realty Corporation  
Former C-6 Facility

**Groundwater Monitoring Wells  
Annual Sampling Event**

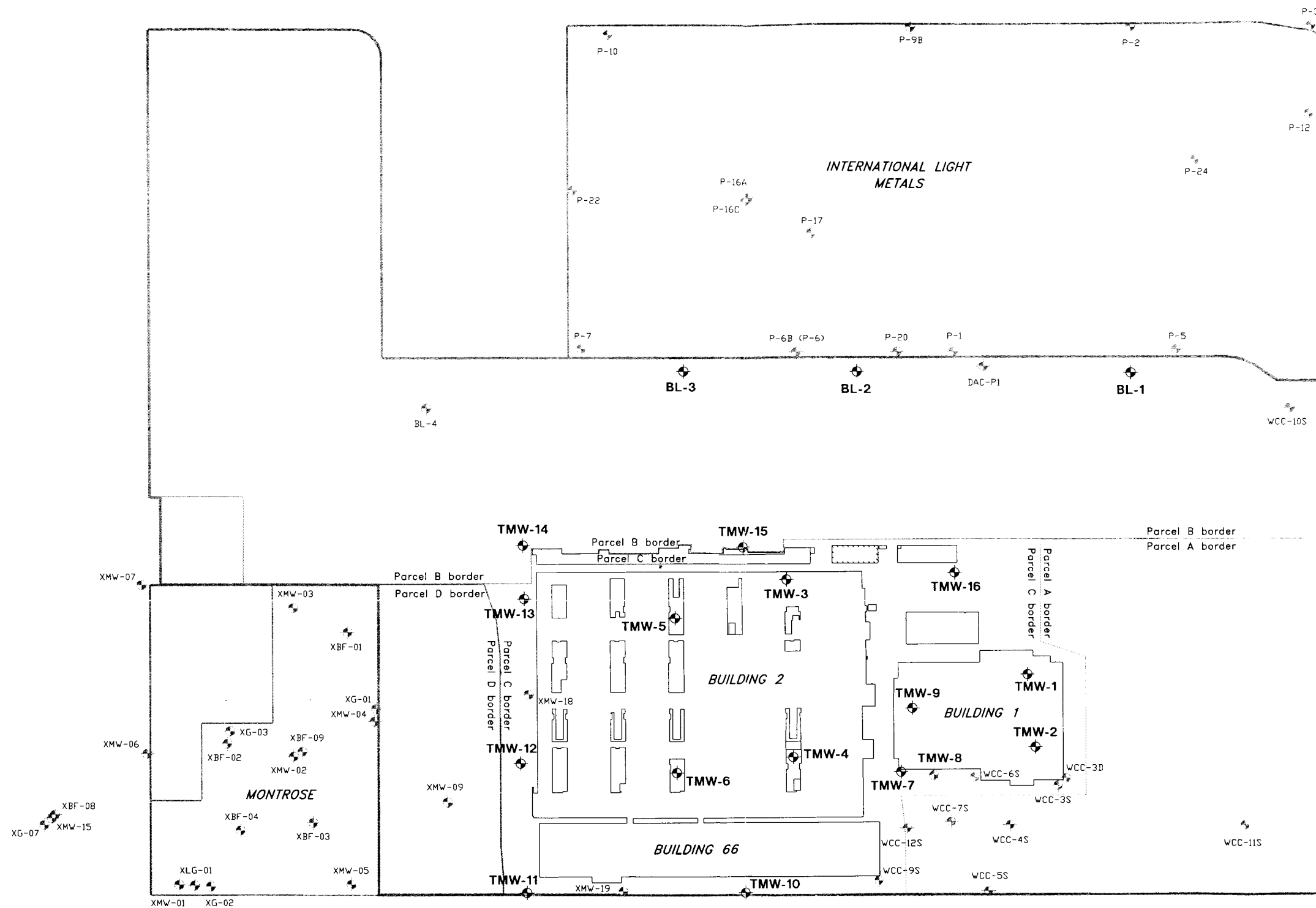
December 2000

K/J 004016.00

**Figure 2**

BOE-C6-01069558

K:\Boeing\MDRC C-6\Jon2001-Sampling Event\Dec2000-F\G3.dwg, 12/15/2000



#### LEGEND

TMW-3

EXISTING WELLS AT FORMER C-6 SITE, ILM AND MONTROSE.

BOLD - ROUTINE TESTING

PREFIXES BEGINNING WITH W, T, B AND D ARE FORMER C-6 FACILITY WELLS

PREFIX BEGINNING WITH P IDENTIFIES INTERNATIONAL LIGHT METALS WELL

PREFIX BEGINNING WITH X IDENTIFIES MONTROSE CHEMICAL CORPORATION WELL

NOTE: THE STATUS OF OFFSITE MONTROSE WELLS HAS NOT BE CONFIRMED.  
SOME WELLS MAY HAVE BEEN ABANDONED.

**Kennedy/Jenks Consultants**

Boeing Realty Corporation  
Former C-6 Facility

**Groundwater Monitoring Wells  
Semiannual Sampling Event**

December 2000  
K/J 004016.00

**Figure 3**

BOE-C6-0106959